



The Weald Federation: Science

With God's Love, we grow and learn together.

Intent

At our schools, we will provide our children with the skills, knowledge and empathy they need to become successful, creative and curious learners. We want our children to develop their ability to ask questions, collect information, organise and test their ideas, solve problems, and apply what they learn. Through quality first teaching we will provide children with opportunities to develop and practice communication skills, collaborative skills, teamwork and perseverance, as well as analytical, critical and reasoning skills. The children will have not only, the fundamental scientific knowledge and skills to navigate everyday life, but also to forge careers as scientists in a variety of fields.

Implementation

The National Curriculum is the starting point for the teaching of all subjects in our school. Statutory requirements are carefully mapped across a two-year cycle, ensuring that skills and knowledge are taught in an order that makes sense. We feel it is important to expand our curriculum, offering to explore the local environment within which our schools are situated as well as providing opportunities to explore aspects of science that we feel might be of interest to our children. We have carefully thought about how scientific knowledge and skills can be sequenced in order to maximise cross-curricular learning opportunities whilst allowing children to build on their prior learning and experiences. We have dedicated a full term in each academic year to working scientifically to enable child-led investigations, encouraging pupils to 'think like scientists', applying and embedding skills and processes.

In The Weald Federation, a positive attitude to science learning is promoted within classrooms, reinforcing an expectation that all children are capable of achieving high standards in science. Through our planning, we ensure there are problem-solving opportunities that allow children to investigate and explore scientific procedures and techniques. Our children are encouraged to ask their own questions and they are given opportunities to use their science knowledge and research skills to discover the answers. When planning, teachers create engaging lessons using a range of resources to aid understanding. We build upon the learning and skill development of the previous years, therefore developing a depth of understanding and progression of skills. As children progress through school, they will explore, question, predict, plan, carry out investigations and observations as well as conclude their findings. As their knowledge and understanding increase, the children become increasingly confident in their growing ability to create their own investigations, basing conclusions on real evidence and their findings. Scientific skills are embedded into lessons to ensure these are being developed throughout the children's school career, with new vocabulary and challenging concepts introduced through direct teaching. Where possible, science is linked to topics and learning journeys that the children undertake as well as opportunities linked to real-life problems to solve.

Assessment is continuous to monitor progress and identify any support (or increased challenge) that might be required. We have high ambitions for every pupil, particularly SEND, disadvantaged and vulnerable pupils. Where needed, lessons are differentiated to ensure that children who need further support have appropriate resources and scaffolding to enable them to successfully access the learning. Pupils that require further challenge will be encouraged to think more deeply about the learning, making connections with their own lives and offering their own opinions based on the evidence presented. Summative assessment is based on a progression of skills and knowledge as per the table on page 4 of this document. As with all areas of learning, we will regularly review, reflect upon and evaluate our science curriculum to ensure that it meets the needs of all the children in our schools.

Impact

The planning and teaching of our curriculum ensures that when children leave primary school, they have the scientific knowledge and skills they need to transition successfully to the next stage of their education. Pupils will understand how science is relevant to everyday life, they will have the foundations to make a positive contribution to society and be confident in their own abilities and proud of their achievements. Our engagement with the local environment ensures that children learn through varied and first-hand experiences of the world around them and have the knowledge to care for its natural beauty. Through various workshops, trips and interactions with experts, our science curriculum will lead our children to be enthusiastic learners, and by building resilience and independence, our pupils will achieve highly and be ready to make valuable contributions to our ever-changing and diverse world.



The Weald Federation: Science Curriculum Map

A	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Yr 1 & 2	Our Planet	Into Winter	China	Toy Stories	Kenya	On Safari
	Living things and their habitats Explore and compare things that are living, dead and never been alive	Seasonal Changes Observe & describe weather associated with the seasons and observe changes across the four seasons.	Materials Exploring different types of material and how materials can change + comparing materials for different uses (link to DT / STEM project)	Working Scientifically Setting up simple practical enquiries, comparative & fair tests + Seasonal Changes	Animals including humans Offspring + basic needs of animals	Animals including humans Carnivores, herbivores & omnivores + Living things and their habitats Exploring African savannah habitats and food chains
Yr 3 & 4	Stone Age to Iron Age	Frozen	Robots	Extreme Earth	Ancient Egypt	Ancient Greece
	Rocks & Soils Comparing and grouping rocks, describing how fossils are formed & understanding how soil is made	States of Matter Solids, liquids & gases, changing state of materials + evaporation & condensation	Forces & Magnets Comparing how things move on different surfaces + magnets	Sound How sounds are made & how they travel, pitch, volume, vibrations	Light Lights & dark, reflecting, dangers of the sun, shadows	Working Scientifically Setting up simple practical enquiries, comparative & fair tests
Yr 5 & 6	Africa	Adventure	Courage	Travel Through Time	Coasts	Oceans
	Living things and their habitats Life cycles + life processes	Electricity Use recognised symbols, compare variations in components	Light Exploring how light travels in straight lines	Animals including humans Changes as humans develop to old age	Working Scientifically Setting up simple practical enquiries, comparative & fair tests + STEM project	Evolution & Inheritance Information provided by fossils, offspring & parents + adaptation

B	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Yr 1 & 2	Into the Woods	Lighting up the Sky	Man on the Moon	India	Sea Explorers	Pirates Ahoy!
	Plants Identifying & naming plants +describing basic structure of common flowering plants & trees + Living things & their habitats Exploring woodland habitats	Working Scientifically Setting up simple practical enquiries, comparative & fair tests	Everyday Materials Exploring every day materials and their properties + suitability for particular uses (link to DT project – Space)	Animals including humans Importance of exercise, nutrition & hygiene	Animals including humans Fish, amphibians, reptiles, birds & mammals + Animals including humans Identifying, & labelling the basic parts of the body	Plants Growing plants, observing, describing and finding out what plants need to grow healthily
Yr 3 & 4	Invasion!	There be Dragons...	Fantastical Adventures	Chocolate!	Environmental Heroes	Rivers
	Working Scientifically Setting up simple practical enquiries, comparative & fair tests	Animals including humans Digestive system (in humans) + teeth and their functions	Electricity Simple circuits, investigations involving batteries, lamps, buzzers & switches, conductors & insulators	Animals including humans Nutrition + skeletons & muscles	Plants functions of different parts of plants, how needs of plants vary + life cycle including pollination, seed formation & seed dispersal	Living things and their habitats Grouping living things, classification, changing environments + Animals including humans Food chains, producers, predators & prey
Yr 5 & 6	Rainforests	Potions!	To Infinity & Beyond	Journeys	Victorians	Inventions
	Living things and their habitats Life cycles & life processes, classification of plants & animals	Properties & Changes of Materials Comparing & grouping materials, dissolving, mixing, separating, changes of state and forming new materials	Earth & Space Earth, moon, planets, solar system and sun (including day & night)	Animals including humans Human circulatory system, function of heart & blood, how nutrients are transported, impact of diet & exercise	Forces Gravity, air & water resistance, friction, mechanisms including levers, pulleys & gears	Working Scientifically Setting up simple practical enquiries, comparative & fair tests + STEM project – Hot Air Balloon

NB: See EYFS Curriculum map to see how learning in EYFS feeds into the whole school curriculum map for Science



The Weald Federation – Disciplinary Knowledge (assessment points)

Skill	Key Stage 1		Lower Key Stage 2		Upper Key Stage 2	
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Asking questions	<ul style="list-style-type: none"> Is beginning to be curious and ask simple questions 	<ul style="list-style-type: none"> Can ask simple questions and recognise that they can be answered in different ways. Can use simple secondary sources to find answers to questions 	<ul style="list-style-type: none"> Beginning to think of simple enquiry questions about scientific phenomena 	<ul style="list-style-type: none"> Can ask relevant questions and begin to think of scientific enquiries to answer them. Beginning to think of new questions arising from a completed investigation 	<ul style="list-style-type: none"> Can ask their own questions about scientific phenomena 	<ul style="list-style-type: none"> Can select and plan the most appropriate type of scientific enquiry to use to answer specific scientific questions
Planning & carrying out investigations	<ul style="list-style-type: none"> Can follow a set instructions accurately 	<ul style="list-style-type: none"> Can carry out simple tests, following given instructions accurately 	<ul style="list-style-type: none"> Is beginning to understand the concept of a 'fair test' Can carry out simple practical enquiries 	<ul style="list-style-type: none"> Can set up and carry out simple practical enquiries, comparative and fair tests accurately 	<ul style="list-style-type: none"> Can begin to explain which variables need to be controlled and why Can plan and carry out practical scientific enquiries 	<ul style="list-style-type: none"> Can plan and carry out different types of scientific enquiries, including recognising and controlling variables where necessary.
Observing and measuring	<ul style="list-style-type: none"> Can use simple equipment such as hand lenses and egg timers to make observations 	<ul style="list-style-type: none"> Can make careful observations using simple equipment such as egg timers and hand lenses and talk about what they have found out 	<ul style="list-style-type: none"> Can use a range of measurement devices and equipment including thermometers and data loggers 	<ul style="list-style-type: none"> Can make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. 	<ul style="list-style-type: none"> Can take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. 	<ul style="list-style-type: none"> Can make their own decisions about what observations to make, what measurements to use and how long for, choosing the most appropriate equipment to make measurements
Recording	<ul style="list-style-type: none"> Is beginning to record and communicate findings in a variety of ways e.g. using pictures, photographs, simple sentences 	<ul style="list-style-type: none"> Can gather and record data to help in answering questions Can record and communicate their findings in a range of ways, beginning to use simple scientific language 	<ul style="list-style-type: none"> Can gather, record, classify and present data in a variety of ways to help answer questions. 	<ul style="list-style-type: none"> Can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. 	<ul style="list-style-type: none"> Can develop keys and other ways of recording to identify, classify and describe living things and materials, 	<ul style="list-style-type: none"> Can record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
Interpreting and reporting	<ul style="list-style-type: none"> Can say what is the same and what is different about a given set of objects, materials or living things 	<ul style="list-style-type: none"> Can identify and classify objects, materials and living things Can compare, sort and group objects, materials and living things, beginning to notice patterns and relationships 	<ul style="list-style-type: none"> Can identify difference, similarities or changes related to simple scientific ideas and processes. 	<ul style="list-style-type: none"> Can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. 	<ul style="list-style-type: none"> Can identify patterns, similarities & differences and use these when drawing simple conclusions and answering questions Can report and present findings from enquiries, including conclusions and causal relationships, in oral and written forms such as displays and other presentations 	<ul style="list-style-type: none"> Can report and present findings from enquiries, including degree of trust in results, both orally and in a variety of written forms Is able to draw conclusions based on their data and observations, identifying evidence that refutes or supports their ideas or arguments.
Evaluate	<ul style="list-style-type: none"> Can verbally discuss the results and findings of a group investigation 	<ul style="list-style-type: none"> Can use their observations and ideas to suggest answers to scientific questions Is beginning to consider what (if anything) might have made their investigation better 	<ul style="list-style-type: none"> Can use straightforward scientific evidence to answer questions or to support their findings. 	<ul style="list-style-type: none"> Is able to use their results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. 	<ul style="list-style-type: none"> Is beginning to separate opinion from fact when using secondary sources Can identify when further tests and observations might be needed 	<ul style="list-style-type: none"> Can use test results to make predictions and identify further comparative and fair tests that may be needed.



The Weald Federation – Substantive Knowledge (assessment points)

Area	Key Stage 1		Lower Key Stage 2		Upper Key Stage 2	
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Animals including Humans	<ul style="list-style-type: none"> Can identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense Can identify and name a variety of common animals that are carnivores, herbivores and omnivores Can identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals Can describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) 	<ul style="list-style-type: none"> Notifies that animals, including humans, have offspring which grow into adults Can describe the basic needs of animals, including humans, for survival (water, food and air) Understands the importance for humans of exercise, eating the right amounts of different types of food, and hygiene 	<ul style="list-style-type: none"> Can explain that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat Can explain that humans and some other animals have skeletons and muscles for support, protection and movement 	<ul style="list-style-type: none"> Can construct and interpret a variety of food chains, identifying producers, predators and prey Can describe the simple functions of the basic parts of the digestive system in humans Can identify the different types of teeth in humans and their simple functions 	<ul style="list-style-type: none"> Can describe the changes as humans develop to old age 	<ul style="list-style-type: none"> Can identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Understands the impact of diet, exercise, drugs and lifestyle on the way their bodies function Can describe the ways in which nutrients and water are transported within animals, including humans
Living things & their habitats, inc. plants & evolution	<ul style="list-style-type: none"> Can identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Can identify and describe the basic structure of a variety of common flowering plants, including trees 	<ul style="list-style-type: none"> Can observe and describe how seeds and bulbs grow into mature plants Can describe how plants need water, light and a suitable temperature to grow and stay healthy Can compare the differences between things that are living, dead, and things that have never been alive Can identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other Can identify and name a variety of plants and animals in their habitats, including microhabitats Can describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food 	<ul style="list-style-type: none"> Can identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Can explain the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Can explain the way in which water is transported within plants Can explain the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal 	<ul style="list-style-type: none"> Knows that living things can be grouped in a variety of ways explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment Understands that environments can change and that this can sometimes pose dangers to living things 	<ul style="list-style-type: none"> Can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Can describe the life process of reproduction in some plants and animals 	<ul style="list-style-type: none"> Can describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals Can give reasons for classifying plants and animals based on specific characteristics Understands that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Understands that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parent Can identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution



The Weald Federation – Substantive Knowledge *cont.* (assessment points)

Area	Key Stage 1		Lower Key Stage 2		Upper Key Stage 2	
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Materials, states of matter & forces	<ul style="list-style-type: none"> • Can distinguish between an object and the material from which it is made • Can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • Can describe the simple physical properties of a variety of everyday materials • Can compare and group together a variety of everyday materials on the basis of their simple physical properties 	<ul style="list-style-type: none"> • Can identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • Understands how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching 	<ul style="list-style-type: none"> • Can compare how things move on different surfaces • Understands that some forces need contact between 2 objects, but magnetic forces can act at a distance • Knows that magnets attract or repel each other and attract some materials and not others • Can compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • Can describe magnets as having 2 poles • Can predict whether 2 magnets will attract or repel each other, depending on which poles are facing 	<ul style="list-style-type: none"> • Can compare and group materials together, according to whether they are solids, liquids or gases • Understands that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) • Can identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature 	<ul style="list-style-type: none"> • Can compare & group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • Knows that some materials will dissolve in liquid to form a solution, and can describe how to recover a substance from a solution • Can use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • Can give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • Understands that dissolving, mixing and changes of state are reversible changes • Understands that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda 	<ul style="list-style-type: none"> • Can explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • Can identify the effects of air resistance, water resistance and friction, that act between moving surfaces • Understands that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect
Our Planet inc. seasonal changes	<ul style="list-style-type: none"> • Can explain changes across the 4 seasons • Can describe weather associated with the seasons and how day length varies 		<ul style="list-style-type: none"> • Can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • Can describe in simple terms how fossils are formed when things that have lived are trapped within rock • Can recognise that soils are made from rocks and organic matter 		<ul style="list-style-type: none"> • Can describe the movement of the Earth and other planets relative to the sun in the solar system and can describe the movement of the moon relative to the Earth • Understands that the sun, Earth and moon are approximately spherical bodies • Can use the idea of the Earth's rotation to explain day & night and the apparent movement of the sun across the sky 	



The Weald Federation – Substantive Knowledge *cont.* (assessment points)

Area	Key Stage 1		Lower Key Stage 2		Upper Key Stage 2	
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Light & Sound			<ul style="list-style-type: none"> Understand that they need light in order to see things and that dark is the absence of light Knows that light is reflected from surfaces Understands that light from the sun can be dangerous and that there are ways to protect their eyes Understands that shadows are formed when the light from a light source is blocked by an opaque object Can find patterns in the way that the size of shadows change 	<ul style="list-style-type: none"> Can identify how sounds are made, associating some of them with something vibrating Understands that vibrations from sounds travel through a medium to the ear Can find patterns between the pitch of a sound and features of the object that produced it Can find patterns between the volume of a sound and the strength of the vibrations that produced it Understands that sounds get fainter as the distance from the sound source increases 		<ul style="list-style-type: none"> Understands that light appears to travel in straight lines Can use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye Understands that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes Can use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
Electricity				<ul style="list-style-type: none"> Can identify common appliances that run on electricity Can construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Can identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery Understands that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Can recognise some common conductors and insulators, and associate metals with being good conductors 		<ul style="list-style-type: none"> Can associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit Can compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches Can use recognised symbols when representing a simple circuit in a diagram.



The Weald Federation: Science Areas of Study - Key Stage 1

CYCLE A - Year 1/2 (statutory content)		CYCLE B - Year 1/2 (statutory content)	
Animals, including humans (Y2 curriculum) <ul style="list-style-type: none"> notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air) 		Animals, including humans (Y1 curriculum) <ul style="list-style-type: none"> identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense 	Animals, including humans (Y2 curriculum) <ul style="list-style-type: none"> describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene
Animals, including humans (Y1 curriculum) <ul style="list-style-type: none"> Identify and name a variety of common animals that are carnivores, herbivores and omnivores 		Animals, including humans (Y1 curriculum) <ul style="list-style-type: none"> identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) 	
Seasonal Changes (Y1 curriculum) <ul style="list-style-type: none"> observe changes across the 4 seasons observe and describe weather associated with the seasons and how day length varies 		Plants (Y1 curriculum) <ul style="list-style-type: none"> identify and name a variety of common wild and garden plants, including deciduous and evergreen trees identify and describe the basic structure of a variety of common flowering plants, including trees 	Plants (Y2 curriculum) <ul style="list-style-type: none"> observe and describe how seeds and bulbs grow into mature plants find out and describe how plants need water, light and a suitable temperature to grow and stay healthy
Living things and their habitats (Y2 curriculum) <ul style="list-style-type: none"> explore and compare the differences between things that are living, dead, and things that have never been alive identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and animals in their habitats, including microhabitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food 		Living things and their habitats (Y2 curriculum) <ul style="list-style-type: none"> identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and animals in their habitats, including microhabitats 	
Everyday materials (Y1 curriculum) <ul style="list-style-type: none"> distinguish between an object and the material from which it is made identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials on the basis of their simple physical properties 	Uses of everyday materials (Y2 curriculum) <ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching 	Everyday materials (Y1 curriculum) <ul style="list-style-type: none"> describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials on the basis of their simple physical properties 	Uses of everyday materials (Y2 curriculum) <ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching



The Weald Federation: Science Areas of Study – Lower Key Stage 2

CYCLE A – Year 3/4 (statutory content)	CYCLE B – Year 3/4 (statutory content)
<p>Rocks (Y3 curriculum)</p> <ul style="list-style-type: none"> compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter 	<p>Plants (Y3 curriculum)</p> <ul style="list-style-type: none"> identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal
<p>Sound (Y4 curriculum)</p> <ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases 	<p>Living things and their habitats (Y4 curriculum)</p> <ul style="list-style-type: none"> recognise that living things can be grouped in a variety of ways explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment recognise that environments can change and that this can sometimes pose dangers to living things <p>Animals, including humans (Y4 curriculum)</p> <ul style="list-style-type: none"> construct and interpret a variety of food chains, identifying producers, predators and prey
<p>States of Matter (Y4 curriculum)</p> <ul style="list-style-type: none"> compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature 	<p>Animals, including humans (Y3 curriculum)</p> <ul style="list-style-type: none"> identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat identify that humans and some other animals have skeletons and muscles for support, protection and movement
<p>Forces & Magnets (Y3 curriculum)</p> <ul style="list-style-type: none"> compare how things move on different surfaces notice that some forces need contact between 2 objects, but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials describe magnets as having 2 poles predict whether 2 magnets will attract or repel each other, depending on which poles are facing 	<p>Electricity (Y4 curriculum)</p> <ul style="list-style-type: none"> identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors
<p>Light (Y3 curriculum)</p> <ul style="list-style-type: none"> recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces recognise that light from the sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by an opaque object find patterns in the way that the size of shadows change 	<p>Animals, including humans (Y4 curriculum)</p> <ul style="list-style-type: none"> describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions



The Weald Federation: Science Areas of Study – Upper Key Stage 2

CYCLE A – Year 5/6 (statutory content)	CYCLE B – Year 5/6 (statutory content)
<p>Light (<i>Y6 curriculum</i>)</p> <ul style="list-style-type: none">• recognise that light appears to travel in straight lines• use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye• explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes• use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	<p>Earth & Space (<i>Y5 curriculum</i>)</p> <ul style="list-style-type: none">• describe the movement of the Earth and other planets relative to the sun in the solar system• describe the movement of the moon relative to the Earth• describe the sun, Earth and moon as approximately spherical bodies• use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky
<p>Evolution & Inheritance (<i>Y6 curriculum</i>)</p> <ul style="list-style-type: none">• recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago• recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents• identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	<p>Forces (<i>Y5 curriculum</i>)</p> <ul style="list-style-type: none">• explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object• identify the effects of air resistance, water resistance and friction, that act between moving surfaces• recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect
<p>Animals, including humans (<i>Y5 curriculum</i>)</p> <ul style="list-style-type: none">• describe the changes as humans develop to old age	<p>Animals, including humans (<i>Y6 curriculum</i>)</p> <ul style="list-style-type: none">• identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood• recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function• describe the ways in which nutrients and water are transported within animals, including humans
<p>Living things and their habitats (<i>Y6 curriculum</i>)</p> <ul style="list-style-type: none">• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals• give reasons for classifying plants and animals based on specific characteristics	<p>Living things and their habitats (<i>Y5 curriculum</i>)</p> <ul style="list-style-type: none">• describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird• describe the life process of reproduction in some plants and animals
<p>Electricity (<i>Y6 curriculum</i>)</p> <ul style="list-style-type: none">• associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit• compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches• use recognised symbols when representing a simple circuit in a diagram.	<p>Properties and changes of materials (<i>Y5 curriculum</i>)</p> <ul style="list-style-type: none">• compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets• know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution• use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating• give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic• demonstrate that dissolving, mixing and changes of state are reversible changes• explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda

National Curriculum in England: Science Programmes of Study

Purpose of Study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes

Aims

The national curriculum for history aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Scientific knowledge and conceptual understanding *(summarised)*

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data.

The nature, processes and methods of science, spoken language & curriculum *(summarised)*

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data.

The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

The programmes of study for science are set out year-by-year for key stages 1 and 2. Schools are, however, only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study. In addition, schools can introduce key stage content during an earlier key stage if appropriate.

All schools are also required to set out their school curriculum for science on a year-by-year basis and make this information available online.

Attainment Targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

National Curriculum in England: Teaching of Science

Key Stage 1

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos. 'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study.

Working Scientifically - NC statutory requirements

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Asking simple questions and recognising that they can be answered in different ways
- Observing closely, using simple equipment
- Performing simple tests
- Identifying and classifying
- Using their observations and ideas to suggest answers to questions
- Gathering and recording data to help in answering questions.

Working Scientifically - NC notes & guidance (non-statutory)

Pupils in years 1 & 2 should explore the world around them and raise their own questions. They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions. They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships. They should ask people questions and use simple secondary sources to find answers. They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language. These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the programme of study can be met by the end of year 2. Pupils are not expected to cover each aspect for every area of study.

National Curriculum in England: Teaching of Science

Lower Key Stage 2

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. 'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study.

Working Scientifically - NC statutory requirements

During years 3 and 4, pupils should be taught to use the through the teaching of the programme of study content:

- Asking relevant questions & using different types of scientific enquiries to answer them
- Setting up simple practical enquiries, comparative & fair tests
- **Making systematic & careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers & data loggers**
- **Gathering, recording, classifying & presenting data in a variety of ways to help in answering questions**
- **Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables**
- **Reporting on findings from enquiries, including oral & written explanations, displays or presentations of results & conclusions**
- **Using results to draw simple conclusions, make predictions for new values, suggest improvements & raise further questions**
- Identifying differences, similarities or changes related to simple scientific ideas & processes
- Using straightforward scientific evidence to answer questions or to support their findings.

'Working Scientifically - NC notes & guidance (non-statutory)

They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data. With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done. They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences. These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the programme of study can be met by the end of year 4. Pupils are not expected to cover each aspect for every area of study.

National Curriculum in England: Teaching of Science

Upper Key Stage 2

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings. 'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study.

Working Scientifically - NC statutory requirements

During years 5 and 6, pupils should be taught the following through the teaching of the programme of study:

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments.

'Working Scientifically - NC notes & guidance (non-statutory)

Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time.